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EXAMINER	
DANG, HUNG Q	

ART UNIT	PAPER NUMBER
2635	3

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/665,229	SLATER ET AL.	
	Examiner	Art Unit	
	Hung Q Dang	2635	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 October 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,11-32 and 34-62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. This communication is in response to applicant's amendment. The amended claims 1, 11, 12, 20, 28, 30-32, 34, 42, 47, 53 and 56-62, the amended specification and the amended drawing have been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1-62 have been considered but are moot in view of the new ground(s) of rejection.

Even though, the claims are rejected with new ground of rejection, however, same prior arts still apply in the rejection. Since the amended independent claims partially incorporate the limitation from the rejected dependent claim, examiner responds to applicant's arguments as follow.

Applicant's argument regarding "Schuermann suggests many applications for transponder units, however moisture content sensors are not a suggested application. Hirsch, disclosing moisture content sensors, predates Schuermann and was therefore available as a possible combination with the Schuermann invention at the time Schuermann was made. Yet, the suggestion to modify Schuermann for an application including moisture content sensors was not among the list of many possible applications and must not, therefore, have been obvious at the time of Schuermann." However, the office has found that this argument is not persuasive because as long as the prior arts suggests the claimed limitations and the date of said prior arts are valid for the rejection purpose, then it would be proper for one skilled in the art to combine said prior arts if there is motivation.

Applicant's argument regarding Hirsch teaches using solar source to provide power for the probe and Hirsch does not teach any alternative power means to provide power for said probe, and therefore, there is no suggestion or motivation to alternatively provide the inductive powering method disclosed by Schuermann et al. to the probe disclosed by Hirsch. The office has found this argument to be not persuasive because one skilled in the art would recognize that such probe would need some sort of power source in order for it to transmit sensed data. Apparently, using solar source and inductive powering to provide power for a device has been conventionally done. Furthermore, inductive powering and using solar as a source of power both help energy conservation. Therefore, it would have been obvious to one of ordinary skill in the art to alternatively provide the inductive power method disclosed by Schuermann et al. to the probe disclosed by Hirsch in order to transmit sensed data to a remote location.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims **1-4, 6-8, 11-18, 24-26, 30-32, 35, 41-43, 46 and 60** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirsch U.S. Patent 4,396,149 in view of Schuermann et al. U.S. Patent 5,053,774.

Regarding claims 1, 11, 14, 16 and 30, Hirsch teaches a data acquisition and telemetry system, comprising at least one probe (Figure 3 unit 17) in communication with at least one soil medium; and a reader, said probe measure at least one moisture parameter of said at least one soil medium and transmit at least one data signal corresponding to said at least one moisture parameter, said at least one data signal being received by said reader (column 2 lines 1-12).

However, Hirsch does not teach that said reader transmits at least one excitation signal having at least an energy component to said at least one probe, said at least one probe using said energy component of said excitation signal to generate transitory electromagnetic energy sufficient to provide power for said at least one probe.

Schuermann et al. teaches a probe for use in conjunction with a reader to facilitate measurement of a medium of interest, wherein said reader transmits at least one excitation signal having at least an energy component to said at least one probe, said at least one probe using said energy component of said excitation signal to generate power for said at least one probe.

Since one skilled in the art would recognize that such probe would need some sort of power source in order for it to transmit sensed data. Apparently, using solar source (disclosed by Hirsch) and inductive powering (disclosed by Schuermann et al.) to provide power for a device has been conventionally done. Furthermore, inductive powering and using solar as a source of power both help energy conservation. Therefore, it would have been obvious to one of ordinary skill in the art to alternatively

provide the inductive power method disclosed by Schuermann et al. to the probe disclosed by Hirsch in order to transmit sensed data to a remote location.

Even though, Hirsch in view of Schuermann et al. does not specifically suggest generating **transitory electromagnetic energy** to provide power for said probe, however, one skilled in the art would recognize that electromagnetic energy has been commonly recognized and utilized, therefore, by conventionality, it would have been obvious to one of ordinary skill in the art to provide a signal having electromagnetic energy in order to provide power to the probe disclosed by Hirsch in view of Schuermann et al.

Regarding claim 12, apparently soil moisture does comprise water potential.

Regarding claim 17, apparently the reader disclosed by Hirsch in view of Schuermann et al. has to convert the data signal to corresponding moisture content data since the purpose of Hirsch's invention is to measure moisture content in soil.

Regarding claims 2, 4, 43 and 60, modulated digital/analog carrier signal has been commonly used in wireless communication industry. Therefore, by conventionality, it would have been obvious to provide a modulated digital carrier signal to the system disclosed by Hirsch in view of Schuermann et al. Furthermore, obviously demodulation would be required to demodulate modulated signals.

Regarding claim 3, Schuermann et al. also teaches frequency modulation (column 10, lines 9-11). Therefore, it would have been obvious to provide frequency modulation to the system disclosed Hirsch, as evidenced by Schuermann et al. in order to modulate signals.

Regarding claim 6, radio frequency signal has been commonly used as excitation signal. Therefore, by conventionality, it would have been obvious to one skilled in the art to provide an excitation signal having radio frequency energy.

Regarding claims 13-15, 24-26 and 46, Schuermann et al. also teaches that said probe and said reader each comprise respective means for receiving and transmitting signals, said respective means for receiving and transmitting signals cooperating with each other to establish an inductive couple between said probe and said reader, said inductive couple facilitating at least transfer of data and energy between said probe and said reader (column 2 line 57 to column 3 line 30). Each of said respective means for receiving and transmitting signals also comprises at least one transmit/receive coil and one resonant antenna.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide mentioned probe and reader to the system disclosed by Hirsch, as evidenced by Schuermann et al., in order to establish an inductive coupling between said probe and said reader.

Regarding claim 18, Schuermann et al. also teaches a modulated carrier signal for the excitation signal and the data signal (column 4, lines 14-22). Apparently, said excitation signal has to contain data regarding the identification of the transponder.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a data component to the excitation signal disclosed by Hirsch, as evidenced by Schuermann et al., in order to identify each transponder.

Regarding claim 41, signal demodulation has been commonly done in wireless signal processing. Therefore, by conventionality, it would have been obvious to one of ordinary skill in the art to provide signal demodulation to the electronic circuit disclosed by Hirsch in view of Schuermann et al. in order to achieve the data from the excitation signal.

Regarding claim 42, claim 42 is rejected for the same reasons as claim 30. Schuermann et al. also teaches that said reader can be transported through out the zone of interest so as to place said reader in operative communication with said probe (column 2 lines 57-68). Therefore, it would have been obvious to one of ordinary skill in the art to provide means for transporting the reader of the system disclosed by Hirsch throughout the zone of interest so as to place said reader in operative communication with said probes, as suggested by Schuermann et al.

Regarding claim 31, the electronic circuit in the probe disclosed by Schuermann et al. also includes at least one energy storage capacitor (unit 136), said at least one energy storage capacitor storing the generated electromagnetic energy and releasing stored energy when said stored energy reaches a predetermined level so as to cause at least a portion of said at least one electronic circuit to resonate and transmit said data signal (column 7 line 32 to column 8 line 6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide mentioned electronic circuit to the probe disclosed by Hirsch, as evidenced by Schuermann et al., in order to generate power to said probe.

Even though Schuermann et al. does not specifically suggests that said data signal having a frequency different than that of said excitation signal, however, it would have been obvious to one of ordinary skill in the art would recognize that using different frequencies for said data signal and said excitation signal would avoid interference for the reader because the reader might be sending out other excitation signals while the data signal is arriving.

Claim 7 is rejected for the same reasons as claim 31.

Regarding claim 8, Schuermann et al. also discloses that the excitation signal and the data signal having equal frequencies (paragraph bridging columns 1-2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to assign same frequency to the excitation signal and the data signal in order to transmit said signals.

Regarding claim 32, as mentioned above, Hirsch in view of Schuermann et al. teaches a probe having an inductive loop as claimed in claim 32 and Hirsch also teaches a moisture sensing capacitor (1st paragraph of column 6). Schuermann et al. also teaches a probe having an electronic circuit comprises an inductive loop such that the energy component induces said electronic circuit to resonate so that said data signal transmitted by said at least one electronic circuit has a frequency substantially equal to a resonant frequency of at least a portion of said at least one electronic circuit (column 8 lines 1-5 and column 9 lines 55-65).

Even though, the signal data transmitted by the probe disclosed by Schuermann et al. does not contain soil moisture data, however, examiner's main purpose of using

Schuermann et al's teaching in this case is to show the commonality of transmitting data signal at a resonant frequency in a telemetry system. And in this case, soil moisture data is merely one type of desired data.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an electronic circuit as disclosed by Schuermann etj al. to the probe disclosed by Hirsch, so that the data signal can be transmitted at a frequency equal to a resonant frequency of said electronic circuit as suggested by Schuermann et al.

Claim 35 is rejected for the same reasons as claim 32.

5. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirsch U.S. Patent 4,396,149 in view of Schuermann et al. U.S. Patent 5,053,774 and in further view of Yamada U.S. Patent 4,903,031.

As mentioned above, Hirsch in view of Schuermann et al. teaches a data acquisition system as claimed in claim 9. However, Hirsch in view of Schuermann et al. does not specifically teach preventing said excitation signal transmitted by said reader from received by said reader.

Yamada teaches a transmission system, which includes circuitry for blocking certain receivers from receiving transmitted signals (paragraph bridging columns 2 and 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a signal block circuitry to the transceiver (reader) of the transmission system disclosed by Schuermann et al. in view of Hirsch,

as evidenced by Yamada, in order to block said transceiver from receiving certain transmitted signals.

6. Claims **19-23, 27-29, 53-58 and 61-62** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuermann et al. U.S. Patent 5,053,774 in view of Hirsch U.S. Patent 4,396,149 and in further view of Olson U.S. Patent 5,337,957.

Claims 19, 20, 53 and 61-62 are similarly rejected for the same reasons as claim 30. However, Hirsch in view of Schuermann et al. does not teach sending a control signal to the moisture probe (object system) to cause a corresponding response by the object system as claimed in claims 20 and 53.

Olson, in the same field of endeavor, teaches sending a control signal to the moisture probe (object system) to cause a corresponding response by the object system (paragraph bridging columns 2 and 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further provide sending a control signal to the object system disclosed by Hirsch in view of Schuermann et al., as evidenced by Olson, in order to cause a corresponding response by the object system.

Regarding claims 56 and 57, processing signal in real time or continuous has been very commonly done in signal processing applications merely depending on how urgent the user wants to have the process completed. Therefore, by conventionality, it would have been obvious to provide real-time or continous data processing as claimed in claims 56 and 57, respectively, to the system disclosed by Hirsch in view of Schuermann et al.

Regarding claims 21-23, Schuermann et al. also teaches a modulated carrier signal for the excitation signal and the data signal (column 4, lines 14-22). Apparently, said excitation signal has to contain data regarding the identification of the transponder.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a data component and a modulated carrier signal to the excitation signal disclosed by Hirsch, as evidenced by Schuermann et al., in order to transmit data and identify each transponder.

Regarding claim 27, Hirsch also teaches that said reader further comprises a data link, said data link facilitating download of data obtained from said data signal to at least one remote site (column 4, lines 60-67).

Regarding claim 28, websites have been very commonly used nowadays. Therefore, by conventionality, it would have been obvious to provide a website, which can be viewed by said remote computer.

Regarding claims 29 and 58, Hirsch does teach monitoring corresponding response by the object system (Figure 7, column 4 line 60 to column 5 line 19).

Regarding claims 54 and 55, Schuermann et al. also teaches that said reader can be transported through out the zone of interest so as to place said reader in operative communication with said probe (column 2 lines 57-68). Therefore, it would have been obvious to one of ordinary skill in the art to provide means for transporting the reader of the system disclosed by Hirsch throughout the zone of interest so as to place said reader in operative communication with said probes, as suggested by Schuermann et al.

Claim 59 is rejected for the same reasons as claim 53.

7. Claims 5, 34, 36-40, 44 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirsch in view of Schuermann et al. U.S. Patent 5,053,774 and in further view of Iltis U.S. Patent 4,683,904.

Regarding claim 34, as mentioned above, Hirsch in view of Schuermann et al. teaches a probe having a moisture sensing capacitor, which as capacitance varies according to the moisture content of the soil, and an electronic circuit resonates so that the data signal is transmitted at a frequency equal to a resonant frequency of said electronic circuit. However, Hirsch in view of Schuermann et al. does not specifically suggest that the resonant frequency of said electronic circuit is primarily determined by the capacitance of said moisture sensing capacitor.

Iltis also teaches an irrigation control system, which includes a moisture sensing capacitor having a capacitance, which varies according to the moisture content of the soil, and the frequency of the oscillations changes as the capacitance changes (paragraph bridging columns 2-3 and abstract).

Since Iltis teaches data signal having frequency changing depending on the capacitance of the moisture sensing capacitor and Hirsch in view of Schuermann et al. suggests transmitting soil moisture data signal at a resonant frequency resonated by an electronic circuit in the probe having capacitance varies according to the moisture content of the soil, therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide transmitting moisture data signal at a

resonant frequency determined by the capacitance of the moisture sensing capacitor disclosed by Hirsch in view of Schuermann et al., as suggested by Iltis, in order to optimally transmit said soil moisture data signal.

Claim 36 is rejected for the same reasons as claim 34.

Regarding claims 37 and 38, apparently the moisture sensing capacitor disclosed by Hirsch comprises a hydrophilic dielectric in order to sense moisture.

Regarding claim 39, as mentioned above, Hirsch in view of Schuermann et al. teaches a system as claimed in claim 39. However, Hirsch in view of Schuermann et al. does not teach said sensing capacitor has a capacitance, which varies according to the moisture content of the soil.

Iltis, in the same field of endeavor, teaches an irrigation control system, which includes a sensing capacitor having a capacitance, which varies according to the moisture content of the soil, and the frequency of the oscillations changes as the capacitance changes (paragraph bridging columns 2-3 and abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a sensing capacitor has a capacitance, which varies according to the moisture content of the soil, to the irrigation system disclosed by Hirsch in view of Schuermann et al., as evidenced by Iltis, in order to measure and transmit the moisture level of the soil.

Regarding claim 40, Schuermann et al. teaches a probe having an electronic circuit, which converts telemetered data into a carrier signal and to modulates said carrier signal so as to produce said data signal (abstract. Since Hirsch in view of

Schuermann et al. and Iltis teaches a probe to monitor (interrogate/respond) soil moisture data corresponding to the varying capacitance of the probe as claimed in claim 39, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide converting the discharge signal of the capacitor disclosed by Hirsch into a carrier signal and modulates said carrier signal so as to produce a data signal as suggested by Schuermann et al. in order to transmit the desired data to the interrogator.

Claim 44 is rejected for the same reasons as claim 39.

Claim 5 is rejected for the same reasons as claim 39.

Claim 62 contains the same limitations as claims 30, 37 and 40 and therefore is rejected for the same reasons as claims 30, 37 and 40.

8. Claims 45, 47, 49, 50 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirsch U.S. Patent 4,396,149 in view of Schuermann et al. U.S. Patent 5,053,774 and in further view of McNabb U.S. Patent 5,927,603.

Regarding claim 45, as mentioned above, Hirsch in view of Schuermann et al. teaches an irrigation system as claimed in claim 45. However, Hirsch in view of Schuermann et al. does not specifically teach means for transporting said reader, which comprises an irrigation system.

McNabb, in the same field of endeavor, teaches an irrigation system, which includes means for transporting a reader, which also comprises an irrigation system (Figure 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide means for transporting the reader, which also comprises an irrigation system, to the irrigation system disclosed by Hirsch in view of Schuermann et al., as evidenced by McNabb, in order to water the soil as the reader get transported through out the zone(s) of interest.

Regarding claim 47, claim 47 is rejected for the same reasons as claims 42 and 45. McNabb also teaches a mobile irrigation structure having a plurality of nozzles (Figure 7, units 26) attached thereto, said plurality of nozzles being in fluid communication with a water source, and said mobile irrigation structure transporting said reader throughout the agricultural field so as to facilitate operative communication between said reader and said plurality of probes; and a control module (Figure 3, unit 46) is in operative communication with said reader and with said plurality of nozzles to regulate flow of water.

Regarding claim 49, McNabb also teaches a mobile irrigation structure comprising a linear move irrigation system (Figure 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a linear move irrigation system to the system disclosed by Hirsch in view of Schuermann et al., as evidenced by McNabb, in order to linearly water the soil with nozzles linearly lined up.

Regarding claim 50, obviously each nozzle has to be controlled individually in order to control the amount of water flow.

Regarding claim 52, digital/analog signals have been very commonly used nowadays. Therefore, by conventionality, it would have been obvious to provide digital excitation/data signals to the system disclosed by Schuermann et al.

9. **Claim 48** is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirsch U.S. Patent 4,396,149 in view of Schuermann et al. U.S. Patent 5,053,774 and in further view of McNabb U.S. Patent 5,927,603 and Wolfe, Jr. U.S. Patent 4,662,563.

As mentioned above, Hirsch in view of Schuermann et al. and McNabb teaches an irrigation system as claimed in claim 48. However, Hirsch in view of Schuermann et al. and McNabb does not specifically suggest a center pivot irrigation system.

Wolfe Jr., in the same field of endeavor, teaches a center pivot irrigation system.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a center pivot irrigation system to the system disclosed by Hirsch in view of Schuermann et al. and McNabb, as evidenced by Wolfe Jr., in order to control the moisture level and water the soil from the center of the field.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11) Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Dang whose telephone number is 703-305-1836. The examiner can normally be reached on Monday through Friday from 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Horabik, can be reached on (703) 305-4704. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Hung Dang
12/29/2003
H.D.

HD

MICHAEL HORABIK
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